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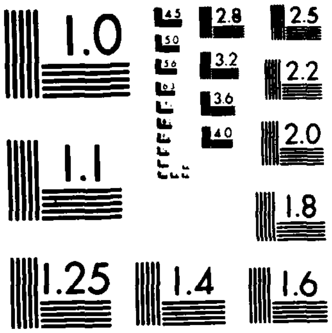

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An Automatic Program Synthesis Bibliography

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January 19, 1988

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References

[1] A Adam. *GADGET—un Programme de Generation Automatique de Programs sur les Graphes et les Ensembles*. PhD thesis, University of Paris VI, 1975.

[2] S Amarel. *Self Organizing Systems*, pages 107–175. Spartan, New York, 1962. titled On the Automatic Formation of a Computer Program which Represents a Theory.

[3] D Angluin. Summers revisited. 1981. Internal Report, Yale University.

[4] D Angluin and C H Smith. A discrete theory of automatic program synthesis. 1981. In preparation.

[5] G Degli Antoni, P A Miglioli, and M Ornaghi. Top-down approach to the synthesis of programs. In *Proceedings of the Programming Symposium*, pages 88–108, Apr 1974.

[6] Automatic Programming Group. *Project MAC Progress Report X*. Technical Report, Massachusetts Institute of Technology, Cambridge, MA, Jul 1973. Page 172-191.

[7] Automatic Programming Group. *Project MAC Progress Report XI*. Technical Report, Massachusetts Institute of Technology, Cambridge, MA, Jul 1974. Page 107-??

[8] R Balzer. A 15 year perspective on automatic programming. *IEEE Transactions on Software Engineering*, SE-11(11):1257–1268, 1985.

[9] R Balzer. *Automatic Programming*. Technical Report RR-73-1, USC Information Sciences Institute, Marina Del Rey, CA, Sep 1972.

[10] R Balzer. A global view of automatic programming. In *Proceedings of the Third International Joint Conference on Artificial Intelligence*, pages 494–499, Aug 1973.

[11] R Balzer. Transformational implementation: an example. *IEEE Transactions or. Software Engineering*, SE-7(1):3–14, 1981.

[12] R Balzer, N Goldman, and D Wile. On the transformational implementation approach to programming. In *Proceedings of the Second International Conference on Software Engineering*, pages 337–344, Oct 1976.

[13] R Balzer, N Greenfeld, M Kay, W Mann, W Ryder, and A Zobrist. Domain-independent automatic programming. In J L Rosenfeld, editor, *Proceedings of IFIP Congress 1974*, pages 326–330, American Elsevier, New York, 1974.

[14] D Barstow. A knowledge-based system for automatic program construction. In *Proceedings of the Fifth International Joint Conference on Artificial Intelligence*, Aug 1977.

[15] D Barstow. The roles of knowledge and deduction in program synthesis. In *Proceedings of the Sixth International Joint Conference on Artificial Intelligence*, pages 37–43, Aug 1979.

[16] D Barstow, R Duffey, S Smoliar, and S Vestal. An automatic programming system to support an experimental science. In *Proceedings of the Sixth International Conference on Software Engineering*, pages 360–366, Sep 1982.

[17] D Barstow and E Kant. Observations on the interactions between coding and efficiency knowledge in the PSI system. In *Proceedings of the Second International Conference on Software Engineering*, pages 19–31, 1977.

[18] D R Barstow. *Automatic Construction of Algorithms and Data Structures Using A Knowledge Base of Programming Rules.* PhD thesis, Stanford University, Stanford, CA, 1977. Stanford AI Memo AIM-308.

[19] D R Barstow. Automatic programming for streams. In *Proceedings of the Ninth International Joint Conference on Artificial Intelligence*, Aug 1985.

[20] D R Barstow. Domain-specific automatic programming. *IEEE Transactions on Software Engineering*, SE-11(11):1321–1336, 1985.

[21] D R Barstow. *Knowledge-Based Program Construction.* North-Holland, New York, 1979.

[22] D R Barstow. A perspective on automatic programming. *Artificial Intelligence Magazine*, 5(1):5–27, 1984.

[23] D R Barstow. The role of knowledge and deduction in algorithm creation. In *International Workshop on Program Construction*, Sep 1980.

[24] J Barzdin. *On Synthesizing Programs Given by Examples.* Technical Report, Computing Center, Latvian State University, Riga, Latvia USSR, 1972.

[25] J M Barzdin. Inductive inference of automata, functions, and programs. *American Mathematical Society Translations*, 109(2):107–112, 1977.

[26] F L Bauer. From specifications to machine code: program construction through formal reasoning. In *Proceedings of the Sixth International Conference on Software Engineering*, Sep 1982.

[27] F L Bauer, M Broy, R Gnatz, W Hesse, and B Krieg-Bruckner. *Notes on the Project CIP: Outline of a Transformation System.* Technical Report TUM-INFO-7729, Technische Universitat Munchen, Munich, Jul 1977.

[28] M A Bauer. Programming by examples. *Artificial Intellligence*, 12(1):1–21, 1979.

[29] W Bibel. Logical program synthesis. In T Moto-oka, editor, *Proceedings of the International Conference on Fifth Generation Computer Systems*, pages 227–236, North-Holland, Amsterdam, 1982. Held in Tokyo in 1981.

[30] W Bibel. Syntax-directed semantics-supported program synthesis. *Artificial Intelligence*, 14:243–261, 1980.

[31] W Bibel, U Furbach, and J F Schreiber. *Programmiersprachen*, page . Volume 12 of *Informatik-Fachberichte*, Springer-Verlag, Berlin, 1978.

[32] W Bibel and K M Hornig. *Automatic Program Construction Techniques*, chapter 3. Macmillan, New York, 1984. titled LOPS, A System Based on a Strategical Approach to Program Synthesis.

[33] M Bidoit, B Biebow, M-C Gaudel, C Gresse, and G Guiho. Exception handling: formal specification and systematic program construction. *IEEE Transactions on Software Engineering*, SE-11(3):242–251, 1985.

[34] M Bidoit, C Gresse, and G Guiho. A system which synthesises array manipulating programs from specifications. In *Proceedings of the Sixth International Joint Conference on Artificial Intelligence*, Aug 1979.

[35] A Biermann, G Guiho, and Y Kodratoff. *Automatic Program Construction Techniques*, chapter 1. Macmillan, New York, 1984. titled An Overview of Automatic Program Construction Techniques.

[36] A W Biermann. *Advances in Computers*, pages 1–63. Volume 15, Academic Press, New York, 1976.

[37] A W Biermann. *Automatic Program Construction Techniques*, chapter 17. Macmillan, New York, 1984. titled Dealing With Search.

[38] A W Biermann. Automatic programming: a tutorial on formal methodologies. *Journal of Symbolic Computation*, 1:119–142, 1986.

[39] A W Biermann. Computer program synthesis from computation traces. In *Proceedings of the Symposium on Fundamental Theory of Programming*, pages 89–100, Oct 1972.

[40] A W Biermann. *Proceedings of European Conference on Computer Algebra (EUROCAL 85)*, pages 124–135. Volume 203 of *Lecture Notes in Computer Science*, Springer-Verlag, Berlin, 1985. Conference in Linz, Austria in Apr 85.

[41] A W Biermann. Regular LISP programs and their automatic synthesis from examples. *IEEE Transactions on Systems, Man, and Cybernetics*, SMC-8(8):585–600, 1978.

[42] A W Biermann, R I Baum, R Krishnaswamy, and F Petry. Autoprogrammer. Feb 1974. 10-minute silent movie.

[43] A W Biermann, R I Baum, and F Petry. Speeding up the synthesis of programs from traces. *IEEE Transactions on Computers*, C-24(2):122–136, 1975.

[44] A W Biermann and R Krishnaswamy. Constructing programs from example computations. *IEEE Transactions on Software Engineering*, SE-2(3):141–153, 1976.

[45] A W Biermann and R Krishnaswamy. A system for program synthesis from examples. In *Proceedings of IEEE Systems, Man, and Cybernetics Conference*, Oct 1974.

[46] A W Biermann and D R Smith. *The Hierarchical Synthesis of LISP Scanning Programs*, pages 41–45. North-Holland, 1977.

[47] A W Biermann and D R Smith. A production rule mechanism for generating LISP code. *IEEE Transactions on Systems, Man, and Cybernetics*, SMC-9(5):260–276, 1979.

[48] T J Biggerstaff. *Automatic Program Construction Techniques*, chapter 18. Macmillan, New York, 1984. titled Design Directed Synthesis of LISP Programs.

[49] T J Biggerstaff. *C2: A 'Super Compiler' Approach to Automatic Programming.* PhD thesis, University of Washington, Seattle, WA, Jan 1976.

[50] T J Biggerstaff and D L Johnson. *Design Directed Program Synthesis.* Technical Report 77-02-01, Department of Computer Science, University of Washington, Seattle, WA, Feb 1977.

[51] B I Blum. Experience with an automated generator of information systems. In *1985 IEEE International Symposium on New Directions in Computing*, pages 138–147, 1985.

[52] B I Blum. An information system for developing information systems. In *1983 National Computer Conference*, pages 743–752, 1983.

[53] B I Blum. A MUMPS program generator with a relational database manager. In , MUMPS Users' Group, Jun 1981.

[54] B I Blum. A tool for developing information systems. In A Wasserman, editor, *Proceedings of the IFIP WG8.1 Working Conference on Automated Tools for Information Systems Design and Development*, pages 215–235, North-Holland, Jan 1982.

[55] M A Breuer. Generation of optimal code for expressions via factorization. *Communications of the ACM*, 12(6):333–340, 1969.

[56] R H Brown. Automatic synthesis of numerical computer programs. In *Proceedings of the Seventh International Joint Conference on Artificial Intelligence*, pages 998–1003, Aug 1981.

[57] R H Brown. Automation of programming; the ISFI experiments. In *1985 IEEE Symposium on Expert Systems in Government Systems*, pages 232–238, 1985.

[58] R H Brown. *Coherent Behavior from Incoherent Knowledge Sources in the Automatic Synthesis of Numerical Computer Programs.* Technical Report MIT-AI-TR-610, Massachusetts Institute of Technology, Cambridge, MA, Jan 1981.

[59] M Broy. Program construction by transformations: a family tree of sorting programs. In A W Biermann and G Guiho, editors, *Proceedings of the NATO Advanced Study Institute*, pages 1–49, D Reidel, Sep-Oct 1981.

[60] J R Buchanan. *A Study in Automatic Programming.* Technical Report, Computer Science Department, Carnegie-Mellon University, Pittsburgh, PA, 1974.

[61] J R Buchanan and D C Luckham. *On Automating the Construction of Programs.* Technical Report, Stanford Artificial Intelligence Laboratory, Stanford, CA, May 1974.

[62] R Burstall and M Feather. Program development by transformations: an overview. In *Proceedings of Toulouse CREST Course on Programming*, 1978.

[63] R M Burstall and J Darlington. Some transformations for developing recursive programs. In *Proceedings of 1975 International Conference on Reliable Software*, pages 465–472, 1975.

[64] R M Burstall and J Darlington. A transformation system for developing recursive programs. *Journal of the Association for Computing Machinery*, 24(1):44–67, 1977.

[65] J Cadiou and Z Manna. Recursive definitions of partial functions and their computations. *SIGPLAN Notices*, 7:58–65, 1972.

[66] F Caio, G Guida, and M Somalvico. Problem solving as a basis for program synthesis: design and experimentation of the BIS system. *International Journal of Man-Machine Studies*, 17:173–188, 1982.

[67] A F Cardenas. Technology for automatic generation of application programs—a pragmatic view. *MIS Quarterly*, Sep 1977.

[68] T E Cheatham Jr and B Wegbreit. A laboratory for the study of automatic programming. In *Proceedings of the AFIPS 1972 SJCC*, pages 11–21, AFIPS Press, 1972. volume 40.

[69] T T Cheng, E D Lock, and N S Prywes. Use of very high level languages and program generation by management professionals. *IEEE Transactions on Software Engineering*, SE-10(5):552–563, 1984.

[70] K L Clark. *The Synthesis and Verification of Logic Programs.* Research Report DOC 81/36, Department of Computing, Imperial College, London, UK, 1981.

[71] K L Clark and J Darlington. Algorithm classification through synthesis. *Computer Journal*, 23(1):61–65, 1980.

[72] K L Clark and S Sickel. Predicate logic: a calculus for deriving programs. In *Proceedings of the Fifth International Joint Conference on Artificial Intelligence*, pages 419–420, Aug 1977.

[73] B Cohen and C Sammut. *Automatic Program Construction Techniques*, chapter 21. Macmillan, New York, 1984. titled Program Synthesis Through Concept Learning.

[74] N H Cohen. Mechanical analysis and restructuring of recursive programs. May 1976. Internal Report, Harvard University.

[75] R L Constable. *Information Processing 71*, pages 733–738. North-Holland, Amsterdam, 1972. titled Constructive Mathematics and Automatic Program Writers.

[76] Y Damghani and T G Cleaver. Courseware authoring tools. In *Conference Proceedings of IEEE SOUTHEASTCON 84*, pages 143–147, IEEE, New York, Apr 1984.

[77] J Darlington. Applications of program transformation to program synthesis. In *Colloques IRIA sur la Construction, L'Amelioration et la Verification Systematique des Programmmes*, pages 133–144, 1975.

[78] J Darlington. *Program Transformation and Synthesis. Present Capabilities.* Technical Report 77/43, Department of Computing and Control, Imperial College, London, UK, 1977.

[79] J Darlington. The synthesis of implementations for abstract data types. In A W Biermann and G Guiho, editors, *Proceedings of the NATO Advanced Study Institute*, pages 309–334, D Reidel, Sep-Oct 1981.

[80] J Darlington. A synthesis of several sorting algorithms. *Acta Informatica*, 11(1):1–30, 1978.

[81] J L Darlington. Automatic program synthesis in second-order logic. In *Advance Papers of the Third International Joint Conference on Artificial Intelligence*, pages 479–485, Aug 1973.

[82] U De Carlini, A Esposito, and B Fadini. Automatic generation of application programs on minicomputers. *International Journal of Mini and Microcomputers*, 6(2):21–25, 1984.

[83] N M Delisle, D E Menicosy, and N L Kerth. Tools for supporting structured analysis. In A Wasserman, editor, *Proceedings of the IFIP WG8.1 Working Conference on Automated Tools for Information Systems Design and Development*, pages 11–20, North-Holland, 1982.

[84] N Dershowitz. Synthetic programming. *Artificial Intelligence*, 25(3):323–373, 1985.

[85] N Dershowitz and Z Manna. On automating structured programming. In *Proceedings Colloques IRIA sur la Construction, L'Amelioration et la Verification Systematique des Programmes*, Jul 1975.

[86] P Deschamp. *Production de Compilateurs a Partir d'une Description Simantique des Langages de Programmation: le Systeme Perluette.* PhD thesis, INPL, Mar 1980. These de Docteur-Ingenieur.

[87] P Dewan. *Automatic Generation of User Interfaces.* PhD thesis, University of Wisconsin, Madison, WI, Aug 1986.

[88] P Dewan and M Solomon. Dost: an environment to support automatic generation of user interfaces. In *Proceedings of the ACM SIGSOFT/SIGPLAN Software Symposium on Practical Software Development Environments*, pages 150–159, Dec 1986.

[89] J W Duran. *A Study of Loop Invariants and Automatic Program Synthesis.* Technical Report SESLTR-12, Department of Computer Science, University of Texas, Austin, TX, 1975.

[90] J Earley. High level operations in automatic programming. In *Proceedings of Symposium on Very High Level Languages*, pages 34–42, 1974.

[91] S L Ehrenreich and W A Harris. JMOS: stepping outside with new cost control. *Bell Laboratories Record*, Jul 1985.

[92] R Elsclager and J Phillips. *Automatic Programming.* Technical Report STAN-CS-79-578, Stanford Artificial Intelligence Laboratory, Stanford, CA, Aug 1979.

[93] R Balzer et al. *Domain-Independent Automatic Programming*, page 326. Volume 74 of *Information Processing*, North-Holland, Amsterdam, 1974.

[94] M Feather. *A System for Developing Programs by Transformations.* PhD thesis, University of Edinbergh, 1979.

[95] M S Feather. *ZAP Program Transformation System, Primer and User's Manual.* Technical Report #54, Department of Artificial Intelligence, University of Edinbergh, 1979.

[96] J A Feldman. *Automatic Programming.* Technical Report 255, Department of Computer Science, Stanford University, Stanford, CA, Feb 1972.

[97] J A Feldman. Some decidability results on grammatical inference of best programs. *Information and Control*, 20:244–262, 1972.

[98] S Fickas. Automatic goal-directed program transformation. In *Proceedings of the First National Conference on Artificial Intelligence*, 1980.

[99] S Fickas. *Automating the Transformational Development of Software.* PhD thesis, University of California, Irvine, CA, 1982.

[100] S F Fickas. Automating the transformational development of software. *IEEE Transactions on Software Engineering*, SE-11(11):1268–1277, 1985.

[101] W Finzer and L Gould. *Programming by Rehearsal.* Memo SCL-84-1, Palo Alto Research Center, May 1984. Sort version in BYTE v9 #6 June 1984.

[102] R W Floyd. Towards interactive design of correct programs. In *Proceedings of IFIP Congress*, pages 7 10, North-Holland, 1967. Volume 1.

[103] R Follett. *Automatic Program Construction Techniques*, chapter 4. Macmillan, New York, 1984. titled Combining Program Synthesis With Program Analysis.

[104] R Follett. *Automatic Program Synthesis.* PhD thesis, University of New South Wales, 1980.

[105] R Follett. Combining program synthesis with program analysis. In *Proceedings of the International Workshop on Program Construction*, Sep 1980.

[106] R Follett. Describing the complete effects of programs. In *Proceedings of the Symposium on Language Design and Programming Methodology*, pages 95–104, Sep 1979.

[107] R Follett. *PROSYN—A Program Synthesiser.* Internal Report, University of New South Wales, 1979.

[108] R Follett. Synthesizing recursive functions with side effects. *Artificial Intelligence*, 13(3):175–200, 1980.

[109] J L Gana. *Use and Extension of an Automatic Program Generator for Model Building in Social and Engineering Sciences.* PhD thesis, University of Pennsylvania, Philadelphia, PA, May 1978.

[110] B L Gates and J A van Hulzen. *Proceedings of European Conference on Computer Algebra (EUROCAL 85)*, pages 583–584. Volume 203 of *Lecture Notes in Computer Science*, Springer-Verlag, Berlin, 1985. Conference in Linz, Austria in Apr 85.

[111] B L Gates and P S Wang. A LISP-based RATFOR code generator. In *Proceedings of the 1984 MACSYMA Users Conference*, pages 319–329, 1984.

[112] R Gerritsen. *Automatically Generated Programs for Information Retrieval.* Technical Report, Graduate School of Industrial Administration, Carnegie-Mellon University, Pittsburgh, PA, 1973.

[113] G Gini. The automatic synthesis of iterative programs. *Information Processing Letters*, 14(2):67–73, 1982.

[114] J Ginsparg. *Natural Language Processing in an Automatic Programming Domain.* Technical Report AIM-316, Stanford University, Jun 1978.

[115] P C Goldberg. *Programming Methodology*, chapter . Volume 23 of *Lecture Notes in Computer Science*, Springer-Verlag, Berlin, 1975. titled Automatic Programming.

[116] S Goto. Program synthesis from natural deduction proofs. In *Proceedings of the Sixth International Joint Conference on Artificial Intelligence*, pages 339–341, Aug 1979.

[117] S Goto. Program synthesis through godel's interpretation. In *Proceedings of the International Conference on Mathematical Studies of Information Processing*, pages 287–306, 1978.

[118] C Green, R Gabriel, E Kant, B Kedziersk, B McCune, J Phillips, S Tappel, and S Westfold. Results in knowledge-based program synthesis. In *Proceedings of the Sixth International Joint Conference on Artificial Intelligence*, pages 342–344, Aug 1979.

[119] C Green, J Phillips, S Westfold, T Pressburger, B Kedzierski, S Angebranndt, B Mont-Reynaud, and S Tappel. *Research on Knowledge-Based Programming and Algorithm Design—1981.* Technical Report KES-U-81-2, Kestrel Institute, Palo Alto, CA, 1981.

[120] C Green and S Westfold. Knowledge-based programming self applied. *Machine Intelligence*, 10, 1982.

[121] C C Green. The design of the PSI program synthesis system. In *Proceedings of the Second International Conference on Software Engineering*, pages 4–18, Oct 1976.

[122] C C Green. A summary of the PSI program synthesis system. In *Proceedings of the Fifth International Joint Conference on Artificial Intelligence*, pages 380–381, Aug 1977.

[123] C C Green and D R Barstow. On program synthesis knowledge. *Artificial Intelligence*, 10:241–279, Nov 1978.

[124] C C Green and D R Barstow. Some rules for the automatic synthesis of programs. In *Advanced Papers of the Fourth International Joint Conference on Artificial Intelligence*, pages 232–239, Sep 1975.

[125] C Gresse. Automatic programming for data types decomposition patterns. In *Proceedings of the Eighth International Joint Conference on Artificial Intelligence*, 1983.

[126] G Guiho and C Gresse. Program synthesis from incomplete specifications. In *Proceedings of the Fifth Conference on Automated Deduction*, pages 53–62, 1980.

[127] M Hammer and G Ruth. *Research Directions in Software Technology*, chapter 20. MIT Press, Cambridge, MA, 1979. titled Automating the Software Development Process.

[128] J Hardy. Synthesis of LISP functions from examples. In *Proceedings of the Fourth International Joint Conference on Artificial Intelligence*, pages 268–273, Sep 1975.

[129] A C Hax and W A Martin. Automatic generation of customized, model-based information systems for operations management. *Data Base*, 140–144, Winter 1973.

[130] G Heidorn. *Automatic Programming Through Natural Language Dialogue.* Technical Report, IBM Thomas J Watson Research Center, Yorktown Heights, NY, 1975.

[131] G Heidorn. *Natural Language Inputs to a Simulation Programming System.* Technical Report, Naval Postgraduate School, Monterey, CA, 1972.

[132] G Heidorn. *Supporting a Computer Directed Natural Language Dialogue for Automatic Business Programming.* Technical Report RC-6041 (#26157), IBM Thomas J Watson Research Center, Yorktown Heights, NY, 1976.

[133] G E Heidorn. Automatic programming through natural language dialogue: a survey. *IBM Journal of Research and Development*, 20(4):302–313, 1976.

[134] C J Hogger. Derivation of logic programs. *Journal of the Association for Computing Machinery*, 28(2):372–392, 1981.

[135] C J Hogger. *Derivation of Logic Programs.* PhD thesis, University of London, 1979.

[136] C J Hogger. Goal-directed derivation of logic programs. In *Proceedings of the Seventh Symposium on Mathematical Foundations of Computer Science*, 1978.

[137] C J Hogger. Program synthesis in predicate logic. In *Proceedings of the AISB/GI Conference on Artificial Intelligence*, 1978.

[138] S Horwitz. *Generating Language-Based Editors: A Relationally-Attributed Approach.* PhD thesis, Cornell University, Ithaca, NY, Aug 1985.

[139] S Horwitz and T Teitelbaum. Generating editing environments based on relations and attributes. *ACM Transactions on Programming Languages and Systems*, 8(4):577–608, 1986.

[140] G W Howe, V J Kruskal, and I Wladawsky. *A New Approach for Customizing Business Applications.* Technical Report RC5474 (#23258), IBM Thomas J Watson Research Center, Yorktown Heights, NY, 1975.

[141] J Hsiang. *Topics in Automated Theorem Proving and Program Construction.* PhD thesis, University of Illinois, Urbana, IL, 1982.

[142] G Huet and B Lang. Proving and applying program transformations expressed with second-order patterns. *Acta Informatica*, 11(1):31–55, 1978.

[143] J-P Jouannaud and G Guiho. Inference of functions with an interactive system. *Machine Intelligence*, 9, 1977.

[144] J-P Jouannaud and G Guiho. *Program Synthesis from Examples for a Simple Class of Non-Loop Functions.* Technical Report, Laboratoire de Recherche en Informatique, Universite de Paris-Sud, 1977.

[145] J-P Jouannaud, G Guiho, and J-P Treuil. SISP/1, an interactive system able to synthesize functions from examples. In *Proceedings of the Fifth International Joint Conference on Artificial Intelligence*, pages 412–418, Aug 1977.

[146] J-P Jouannaud and Y Kodratoff. An automatic construction of LISP programs by transformations of functions synthesized from their input-output behavior. *International Journal of Policy Analysis and Information Systems*, 4:331–358, 1980.

[147] J-P Jouannaud and Y Kodratoff. Characterization of a class of functions synthesized from examples by a summers-like method using a boyer-moore-wegbreit matching technique. In *Proceedings of the Sixth International Joint Conference on Artificial Intelligence*, pages 440–447, Aug 1979.

[148] J-P Jouannaud and Y Kodratoff. Program synthesis from examples of behavior. In A W Biermann and G Guiho, editors, *Proceedings of the NATO Advanced Study Institute*, pages 213–250, D Reidel, Sep-Oct 1981.

[149] E Kant. *Efficiency Considerations in Program Synthesis: A Knowledge-Based Approach.* PhD thesis, Stanford University, Stanford, CA, Sep 1979.

[150] E Kant. *Efficiency in Program Synthesis.* UMI Research Press, Ann Arbor, MI, 1981.

[151] E Kant. On the efficient synthesis of efficient programs. *Artificial Intelligence*, 20(3):253–305, 1983.

[152] E Kant. The selection of efficient implementations for a high-level language. In *Proceedings of the ACM SIGART-SIGPLAN Symposium on Artificial Intelligence and Programming Languages*, Aug 1977.

[153] E Kant. Understanding and automating algorithm design. *IEEE Transactions on Software Engineering*, SE-11(11):1361–1374, 1985.

[154] E Kant and D R Barstow. *Interactive Programming Environments*, pages 487–513. McGraw-Hill, New York, 1984. titled The Refinement Paradigm: The Interaction of Coding and Efficiency Knowledge in Program Synthesis.

[155] E Kant and A Newell. An automatic algorithm designer: an initial implementation. In *Proceedings of the American Association of Artificial Intelligence*, 1983.

[156] U Kastens, B Hutt, and E Zimmerman. *GAG: A Practical Compiler Generator*. Volume 141 of *Lecture Notes in Computer Science*, Springer-Verlag, Berlin, 1982.

[157] A I Kazmin, A A Menn, and N N Nepeivoda. Table approach tc automatic program synthesis. *Programmirovanie*, (2):24-34, Mar-Apr 1982. In Russian, translated by Plenum Publishing in 1983.

[158] Y Kodratoff. Choix d'un programme LISP correspondant a un exemple. In *Congres AFCET-IRIA Reconnaissance des Formes et Traitement des Images*, pages 212–219, 1978.

[159] Y Kodratoff. A class of functions synthesized from a finite number of examples and a LISP program scheme. *International Journal of Computer and Information Sciences*, 8:489–521, 1979.

[160] Y Kodratoff and J Fargues. A sane algorithm for the synthesis of LISP functions from example problems: the boyer-moore algorithm. In *Proceedings of the AISB Meeting*, pages 169–175, 1978.

[161] Y Kodratoff and J-P Jouannaud. *Automatic Program Construction Techniques*, chapter 16. Macmillan, New York, 1984. titled Synthesizing LISP Programs Working on the List Level of Embedding.

[162] Y Kodratoff and E Papon. A system for program synthesis and program optimization. In *Proceedings of AISB*, pages 1–10, 1980.

[163] G Kreisel. Some uses of proof theory for finding computer programs. In *Colloque International de Logique*, pages 123–134, 1977.

[164] M Kyllastinen. Aspects about automatic programming. In *Proceedings of NORDATA 81*, Dansk Databehandlingsforening, Copenhagen, Denmark, Jun 1981.

[165] W T Laaser. *Synthesis of Recursive Programs*. PhD thesis, Stanford University, Stanford, CA, 1979.

[166] S S Lavrov. Program synthesis. *Kibernetika*, (6):11-16, Nov-Dec 1982. in Russian, translated in 1983 by Plenum Publishing.

[167] R C Lee, C L Chang, and R J Waldinger. An improved program-synthesizing algorithm and its correctness. *Communications of the ACM*, 17(4):211–217, 1974.

[168] R C Lee and S K Chang. Structured programming and automatic program synthesis. In *Proceedings of the Symposium on Very High Level Languages*, pages 60–70, Mar 1974.

[169] E Levinson, L S Levy, and J B Salisbury. CARL—experience of an application using clusters. In *Proceedings of NCC*, 1980.

[170] L S Levy. A metaprogramming method and its economic justification. *IEEE Transactions on Software Engineering*, SE-12(2):272–277, 1986.

[171] W J Long. *A Program Writer*. PhD thesis, Massachusetts Institute of Technology, Cambridge, MA, 1977. Report LCS/TR-187.

[172] J Low. *Automatic Coding: Choice of Data Structures*. Technical Report AIM-242, Stanford University, Stanford, CA, Aug 1974.

[173] C J Lucena and T H Pequeno. Program derivation using data types: a case study. *IEEE Transactions on Software Engineering*, SE-5(6):586–592, 1979.

[174] D C Luckham and J R Buchanan. Automatic generation of programs containing conditional statements. In *Proceedings of Conference on Artificial Intelligence and the Simulation of Behavior*, pages 102–126, Jul 1974.

[175] P A Luker. MODELLER—computer-assisted modelling of continuous systems. *Simulation*, 42(5), 1984.

[176] P A Luker and A Burns. Program generators and generation software. *Computer Journal*, 29(4):315–321, 1986.

[177] P A Luker and J Stephenson. *Simulation of Systems*, page . North-Holland, Amsterdam, 1979.

[178] Z Manna and R Waldinger. The automatic synthesis of recursive programs. In *Proceedings of the Symposium on Artificial Intelligence and Programming Languages*, 1977.

[179] Z Manna and R Waldinger. A deductive approach to program synthesis. *ACM Transactions on Programming Languages and Systems*, 2(1):90–121, 1980.

[180] Z Manna and R Waldinger. Knowledge and reasoning in program synthesis. *Artificial Intelligence Journal*, 6(2):175–208, 1980.

[181] Z Manna and R Waldinger. Synthesis: dreams ⇒ programs. *IEEE Transactions on Software Engineering*, SE-5(4):294–328, 1979.

[182] Z Manna and R Waldinger. Toward automatic program synthesis. *Communications of the ACM*, 14(3):151-165, 1971.

[183] W A Martin. OWL, a system for building expert problem solving systems involving verbal reasoning. Course 6.871 notes, MIT Spring 74.

[184] M Masson. Automatic program generation. In *Proceedings of the Eighth International Conference on Cybernetics*, International Association of Cybernetics, Namur, Belgium, Sep 1976. in French.

[185] H Matsunaga, T Mizuno, and T Ideguchi. Design and implementation of automatic program generation system based on the formal description of protocols. *Transactions of Information Processing Society of Japan*, 22(6):574–580, 1981. in Japanese.

[186] B P McCune. The PSI program model builder: synthesis of very high-level programs. In *Proceedings of ACM SIGART-SIGPLAN Symposium on Artificial Intelligence and Programming Languages*, pages 130–139, Aug 1977.

[187] W M McKeeman, J J Horning, and D B Wortman. *A Compiler Generator.* Prentice-Hall, Englewood Cliffs, NJ, 1970.

[188] G Mints and E Tyugu. Justification of the structural synthesis of programs. *Science of Computer Programming*, 2(3):215–240, 1982.

[189] L Molnar and P Navrat. System of automatic synthesis of programs with abstract data types. In *Tagungsbuch 30. Internationales Wiss. Kolloquium TH Ilmenau*, pages 155–158, Vortragsreihe Informatik, 1985.

[190] L Molnar and P Navrat. Using hints in automatic program synthesis. In *Proceedings of SOFASR 78*, pages 312–327, 1978.

[191] D J Mostow. *Mechanical Transformation of Task Heuristics into Operational Procedures.* PhD thesis, Carnegie-Mellon University, Pittsburgh, PA, 1981.

[192] P Navrat. *Automatic Program Synthesis and Methodology of Programming.* PhD thesis, Slovak Technical University, Bratislava, Czechoslovakia, 1983.

[193] J M Neighbors. *Software Construction Using Components.* PhD thesis, University of California, Irvine, CA, 1980.

[194] Office of Planning and Research. *Automatic Generation of Computer Programs for Converting Transmitter Data to IRS Standards—Phase I Report.* Contract TIR-77-62, Internal Revenue Service, Washington, DC, 1977.

[195] Office of Planning and Research. *MODEL II--Automatic Program Generator User's Manual.* Internal Revenue Service, Washington, DC, Jul 1978. Contract TIR-77-41.

[196] Mathematical Computing Advisory Panel. *Symposium on Automatic Programming for Digital Computers*, Office of Naval Research, Department of the Navy, May 1954.

[197] E Papon. *Algorithmes de Detection dc Relations de Recurrence - Application a la Synthese et a la Transformation de Programmes*. PhD thesis, Universite Orsay, 1981. These de 3eme cycle.

[198] L Paulson. *A Compiler Generator for Semantic Grammars*. PhD thesis, Stanford University, Stanford, CA, Dec 1981.

[199] J Penjam. A method of automatic implementation of compilers. *Cybernetics*, 4, 1980.

[200] J Penjam. Synthesis of semantic processors from attribute grammars. *System Programming Computer Software*, 1:50–60, 1983.

[201] A J Perlis. Automatic programming. *Quarterly Applied Math*, 30:85–90, 1972.

[202] F E Petry. *Program Inference from Example Computations Represented by Memory Snapshot Traces*. Technical Report OSU-CISRC-TR-75-1, Computer and Information Science Research Center, Ohio State University, Columbus, OH, 1975.

[203] F E Petry. *Program Inference from Example Computations Represented by Memory Snapshot Traces*. PhD thesis, Ohio State University, Columbus, OH, 1974.

[204] J V Phillips. Program inference from traces using multiple knowledge sources. In *Proceedings of the Fifth International Joint Conference on Artificial Intelligence*, page 812, Aug 1977.

[205] A Pnueli, N S Prywes, and R Zarhi. *Automatic Program Construction Techniques*, chapter 13. Macmillan, New York, 1984. titled Scheduling Equational Specifications and Non Procedural Programs.

[206] N Prywes. *Advances in Computers*, chapter . Volume 16, Academic Press, New York, 1977. titled Automatic Generation of Computer Programs.

[207] N Prywes and A Pnueli. Automatic program generation in distributed cooperative computation. *IEEE Transactions on Systems, Man, and Cybernetics*, SMC-14(2):275–286, 1984.

[208] N S Prywes, A Pnueli, and S Shastry. Use of a nonprocedural specification language and associated program generator in software development. *ACM Transcations on Programming Languages and Systems*, 1(2):196–217, 1979.

[209] J A Ramirez. *Automatic Generation of Data Conversion Programs Using a Data Description Language.* PhD thesis, University of Pennsylvania, Philadelphia, PA, 1973.

[210] P Raulefs. *Automatic Synthesis of Minimal Algorithms from Samples of the Behavior.* Technical Report INFI-73-2, Institut fur Informatik, Universitat Karlsruhe, Karlsruhe, West Germany, Jan 1973.

[211] T Reps and T Teitelbaum. The synthesizer generator. In *Proceedings of ACM SIGSOFT/SIGPLAN Software Engineering Symposium on Practical Software Development Environments*, pages 42–48, Apr 1984.

[212] C Rich. *A Library of Plans with Applications to Automated Analysis, Synthesis, and Verification of Programs.* Technical Report TR-604, MIT Artificial Intelligence Laboratory, Cambridge, MA, Jan 1982.

[213] C Rieger and P London. Subgoal protection and unravelling during plan synthesis. In *Proceedings of the Fifth International Joint Conference on Artificial Intelligence*, pages 487–493, Aug 1977.

[214] N A Rin. *Automatic Generation of Business Data Processing Programs from a Non-Procedural Language.* PhD thesis, University of Pennsylvania, Philadelphia, PA, 1973.

[215] G-C Roman. An argument in favor of mechanized software production. *IEEE Transactions on Software Engineering*, SE-3(6):406–415, 1977.

[216] S Russell and A S Elmaghraby. An automatic program generator for dynamic simulation. In *Conference Proceedings of IEEE SOUTHEASTCON 84*, pages 111–114, IEEE, New York, Apr 1984.

[217] G Ruth. Automatic design of data processing systems. In *Proceedings of the Third ACM Symposium on Principles of Programming Languages*, Jan 1976.

[218] G Ruth. *Protosystem I: An Automatic Programming System Prototype.* Technical Report LCS-TM-72, Laboratory for Computer Science, MIT, Cambridge, MA, Jul 1976.

[219] K Sakaue and H Tamura. Automatic generation of image processing programs by knowledge-based verification. In *Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition*, pages 189–192, IEEE Computer Society Press, Silver Spring, MD, Jun 1985.

[220] M Sato. Towards a mathematical theory of program synthesis. In *Proceedings of the Sixth International Joint Conference on Artificial Intelligence*, pages 757–762, Aug 1979.

[221] W L Scherlis. *Expression Procedures and Program Derivation.* PhD thesis, Stanford University, Stanford, CA, 1980.

[222] A C Semeco, P Eamsherangkoon, S P Roth, and D Q Vu. The role of understnading in automated program synthesis. In *Proceedings of SPIE—Applications of Artificial Intelligence II*, SPIE—The International Society for Optical Engineering, Bellingham, WA, Apr 1985.

[223] S Shastry. *Verification and Correction of Non-Procedural Specifications in Automatic Generation of Programs.* PhD thesis, University of Pennsylvania, Philadelphia, PA, May 1978.

[224] D Shaw, W Swartout, and C Green. Inferring LISP programs from examples. In *Proceedings of the Fourth International Joint Conference on Artificial Intelligence*, pages 268–273, Sep 1975.

[225] L Siklossy. The synthesis of programs from their properties, and the insane heuristic. In *Proceedings of the Third Texas Conference on Computing Systems*, 1974.

[226] L Siklossy and D A Sykes. Automatic program synthesis from example problems. In *Advance Papers for the Fourth International Joint Conference on Artificial Intelligence*, pages 268–273, Sep 1975.

[227] C H Smith. Applications of a general theory of learning by example to automatic program synthesis. In *Proceedings of the International Conference on Systems, Man and Cybernetics*, pages 373–375, Dec-Jan 1983.

[228] C H Smith. The power of parallelism for automatic program synthesis. In *Proceedings of the 22nd Annual Symposium on Foundations of Computer Science*, pages 283–295, IEEE, 1981.

[229] D R Smith. *A Class of Synthesizable LISP Programs.* Master's thesis, Duke University, Durham, NC, Jun 1977.

[230] D R Smitl . *Sixth Conference on Automated Deduction*, pages 172–193. Volume 138 of *Lecture Notes in Computer Science*, Springer-Verlag, Berlin, 1982. titled Derived Preconditions and their Use in Program Synthesis.

[231] D R Smith. A survey of synthesis of LISP programs from examples. In *Proceedings of the International Workshop on Program Construction*, Sep 1980.

[232] D R Smith. Top-down synthesis of divide-and-conquer algorithms. *Artificial Intelligence*, 27(1):43–96, 1985.

[233] D R Smith. *Top-Down Synthesis of Simple Divide-and-Conquer Algorithms.* Technical Report NPS-52-82-11, Department of Computer Science, Naval Postgraduate School, Monterey, CA, 1982.

[234] J M Spitzen. *Approaches to Automatic Programming.* Technical Report TR 17-74, Center for Research in Computing Technology, Harvard University, Cambridge, MA, 1974.

[235] R Sproull. *Using Program Transformations to Derive Line-Drawing Algorithms.* Technical Report CMU-CS-81-117, Carnegie-Mellon University, Pittsburgh, PA, 1981.

[236] C V Srinivasan. *Programming Over a Knowledge Base: The Basis for Automatic Programming.* Technical Report SPSAP-TM-4, Department of Computer Science, Rutgers University, New Brunswick, NJ, 1973.

[237] T A Standish. *Observations and Hypotheses about Program Synthesis Mechanisms.* Technical Report 278, Bolt, Beranek, and Newman, Cambridge, MA, 1973.

[238] E Subrahmanian and R L Cannon. A generator program for models of discrete-event systems. *Simulation*, 93–101, 1981.

[239] P A Subrahmanyam. An automatic/interactive software development system: formal basis and design. In A Wasserman, editor, *Proceedings of the IFIP WG8.1 Working Conference on Automated Tools for Information Systems Design and Development*, pages 125–146, North-Holland, 1982.

[240] P A Subrahmanyam. A basis for a theory of program synthesis. In *Proceedings of the First Annual National Conference on Artificial Intelligence*, pages 74–76, Aug 1980.

[241] P A Subrahmanyam. *A Formal Basis for Program Synthesis.* Technical Report, University of Utah, Feb 1980.

[242] P A Subrahmanyam. *Towards a Theory of Program Synthesis: Automating Implementations of Abstract Data Types.* PhD thesis, State University of New York at Stony Brook, Aug 1979.

[243] P D Summers. A methodology for LISP program construction from examples. *Journal of the Association for Computing Machinery*, 24:161–175, 1978.

[244] P D Summers. *Program Construction from Examples.* PhD thesis, Yale University, New Haven, CT, Dec 1975.

[245] W Swartout. XPLAIN: a system for creating and explaining expert consulting programs. *Artificial Intelligence*, 21:285–325, 1983.

[246] J-P Treuil, J-P Jouannaud, and G Guiho. *LQAS un Systeme-Question-Reponse Base sur l'Apprentissage et la Synthese de Programmes a Partir d'Ezamples.* Technical Report, Institut de Programmation, Universite de Paris VI. Mar 1977.

[247] E Tyugu. *Methods of Algorithmic Language Implementation*, pages 251–267. Volume 47 of *Lecture Notes in Computer Science*, Springer-Verlag, Berlin, 1977. titled A Programming System with Automatic Program Synthesis.

[248] E Kh Tyugu. Computational frames and structural synthesis of programs. *Engineering Cybernetics*, (6):101–106, 1982.

[249] E Kh Tyugu. A system of programming with automatic construction of algorithms. In *Proceedings of the Symposium on Methods of Realization of New Algorithmic Languages*, 1975.

[250] J W Ulrich and R Moll. Program synthesis by analogy. In *Proceedings of Symposium on Artificial Intelligence and Programming Languages*, pages 22–28, Aug 1977.

[251] USC/Information Sciences Institute. *Automatic Programming.* Annual Technical Report SR-75-3, USC/Information Sciences Institute, Marina Del Rey, CA, Jun 1975. Page 24-?

[252] V Vojtek. *Contribution to the Automatic Program Synthesis.* PhD thesis, Slovak Technical University, Bratislava, Czechoslovakia, 1985.

[253] V Vojtek, L Molnar, and P Navrat. Automatic program synthesis using heuristics and interaction. *Computers and Artificial Intelligence*, 5(5):429–442, 1986.

[254] F W von Henke. On generating programs from data types: an approach to automatic programming. In *Proceedings Colloques IRIA sur la Construction, L'Amelioration et la Verification Systematique des Programmes*, 1975.

[255] R Waldinger. *Constructing Programs Automatically Using Theorem Proving.* PhD thesis, Carnegie-Mellon University, Pittsburgh, PA, 1969.

[256] R Waldinger and R Lee. PROW: a step toward automatic programming. In *Proceedings of the International Joint Conference on Artificial Intelligence*, 1969.

[257] D Warren. Generating conditional plans and programs. In *Proceedings of the AISB Summer Conference*, pages 344–354, Jul 1976.

[258] M Wegmann and M Baechler. A concept for the implementation of dialogue systems. *Output*, 11(4):31–35, 1982. in German.

[259] I Wladawsky. The mentor for business applications (MBA): a natural language automatic programming system. Mar 1975. Memo, IBM Thomas J Watson Research Center.

[260] R J Wood. *Computer Aided Program Synthesis*. Technical Report TR-861, University of Maryland, College Park, MD, 1980.

[261] W A Wulf. PQCC: a machine-relative compiler technology. In *Proceedings of COMPSAC 80*, pages 24-36, Oct 1980.

[262] R T Yeh, R Mittermeir, N Rossopoulos, and J Reed. A programming environment framework based on reusability. In *Proceedings of the International Conference on Data Engineering*, pages 277–280, IEEE Computer Society Press, Silver Spring, MD, Apr 1984.